Course Syllabus

	Course	STAT/MATH/BIMS 3335.001
	Course Title	Informatics and Programming
	Professor	Hyunwoong “Woody” Chang
	Term	Fall 2025 (August 25, 2025- December 9, 2025)
	Meetings	TR 1:00pm-2:15pm @ SCI 1.202

Professor’s Contact Information

Office Location	FO 2.610A
Office Hours	TR 2:30 pm – 3:30 pm / by appointment
Email Address	hwchang@utdallas.edu

Note: You must include [STAT/MATH/BIMS 3335] in front of the subject. Please do not use the eLearning system to send me an email. You may use “Discussion Board” tab in eLearning for course-related questions.

TA	
Office Hours	TBA
Email	

General Course Information

Pre-requisites	(MATH 1325 or MATH 2413) and (STAT 1342 or STAT 2332 or STAT 3332)
Textbook	Lecture notes will be provided.
Suggested Texts	● An Introduction to Statistical Learning with Applications in R/Python, Gareth James , Daniela Witten , Trevor Hastie , Robert Tibshirani , Jonathan Taylor. Download: https://www.statlearning.com/ ● R for Data Science (2e), Hadley Wickham. Download: https://r4ds.hadley.nz/intro.html ● Psychometrics in Exercises using R and RStudio, Anna Brown. Download: https://bookdown.org/annabrown/psychometricsR/ ● Ten Projects in Applied Statistics, Peter McCullagh, 2023. ● Introduction to GWAS, Pieter Clauw. View: https://github.com/picla/GWAS_workshop_CK
Important dates	First day of class: Aug 26, 2025 Last day of class: Dec 9, 2025 Midterm: **Oct 7, 2025** (the same location/time of the regular class) Final exam: time and location TBA Homeworks: weekly on **Mondays** (due next Mondays at 11:59 PM Central Time for full credit) No class: 11/25, 11/27 (Thanksgiving break)

Course description and learning outcome

This course is designed to introduce students to programming (R/Python) and applications in scientific research, especially in biological sciences. The course is organized into two main parts that progressively build skills in programming with experience on domain-specific analysis, and advanced methodology development. The overall goal is to enable students to apply computing tools to real-world data, develop reproducible workflows, and begin contributing as independent analysts.

● Foundations of Statistical Computing: Python and R. In Python, we cover Basic programming syntax (Python 101), Data manipulation using NumPy and Pandas, Data visualization, Web data access via requests, String processing using regular expressions, Introduction to linear modeling, Basics of SQL integration for data querying. In R, students will be introduced to R syntax and scripting, with an emphasis on the tidyverse ecosystem. Core topics include data manipulation using the dplyr package and effective data visualization using both base R and ggplot2. The course will also cover best practices for package usage and reproducible workflows. The homeworks will be designed in a way that students will apply statistical computing skills to real-world research problems across several domains, gaining experience with real or simulated data. **Psychometrics:** Students will design their own survey instruments, perform data cleaning and preprocessing, and apply psychometric tools to assess reliability and structure using R or Python packages. **Clinical Trials:** Using data from a clinical study (e.g., mouth surgery), students will conduct power analysis and explore approaches to handle missing data. **Genomics:** Students will work with GWAS (Genome-Wide Association Study) datasets, focusing on data visualization techniques for high-dimensional genetic data. **Machine Learning Tasks:** Basic linear regression tasks will be introduced to show how learning algorithms can be applied to scientific questions.

By the end of the course, students will be able to:
1. Use Python and R to load, clean, and analyze data using appropriate libraries and workflows.
2. Apply statistical computing techniques to real-world research problems such as psychometrics, clinical trials, and genomics.
3. Perform power analysis, handle missing data, and implement simple linear models.

Course Policies

Class Attendance	Regular class attendance is assumed, and anything that is missed because a student is not in class is the student's responsibility. Refer to the Student Code of Conduct.
Grading (credit) Criteria	Attendance: 10% (If absent, provide the proof of the reason.) Homework: 30% (Homework will be mostly weekly, one lowest homework mark will be dropped) Midterm: 20% Final exam: 40%
Grading Scheme	**The course grade is based on the overall course score**: A+ 98-100; A 93-97.9999; A- 90-92.9999;

	B+ 87-89.9999; B 83-86.9999; B- 80-82.9999; C+ 77-79.9999; C 73-76.9999;C- 65-72.9999; D+ 60-64.9999; D 55-59.9999; D- 50-54.9999; F 0-49.9999
Make-up Exams	**No make-up exam will be given unless there is a documented emergency.**
Late Homework	No late homework will be accepted. You will be allowed to take **Makeup** homework based on the university excused absence. If you believe this applies to you, **you must let me know by 5:00 pm** on the assignment due date (Monday).
Classroom Citizenship	You are encouraged to ask questions and participate in discussions in the class. The use of cellphones is not allowed during class, so make sure your cellphone is on silent, and that you are not texting, reading emails, playing games, etc.

Technical Requirements

In addition to a confident level of computer and Internet literacy, certain minimum technical requirements must be met to enable a successful learning experience. Please review the important technical requirements on the Getting Started with eLearning webpage.

Course Access and Navigation

This course can be accessed using your UT Dallas NetID account on the eLearning website. Please see the course access and navigation section of the Getting Started with eLearning webpage for more information. To become familiar with the eLearning tool, please see the Student eLearning Tutorials webpage.

UT Dallas provides eLearning technical support 24 hours a day, 7 days a week. The eLearning Support Center includes a toll-free telephone number for immediate assistance (1-866-588-3192), email request service, and an online chat service.

Communication

This course utilizes online tools for interaction and communication. Some external communication tools such as regular email and a web conferencing tool may also be used during the semester. For more details, please visit the Student eLearning Tutorials webpage for video demonstrations on eLearning tools.

Student emails and discussion board messages will be answered within 3 working days under normal circumstances. If not, please send it again.

Distance Learning Student Resources

Online students have access to resources including the McDermott Library, Academic Advising, The Office of Student AccessAbility, and many others. Please see the eLearning Current Students webpage for more information.

Server Unavailability or Other Technical Difficulties

The University is committed to providing a reliable learning management system to all users. However, in the event of any unexpected server outage or any unusual technical difficulty, which prevents students from completing a time sensitive assessment activity, the instructor will provide an appropriate accommodation based on the situation. Students should immediately report any problems to the instructor and also contact the online eLearning Help Desk. The instructor and the eLearning Help Desk will work with the student to resolve any issues at the earliest possible time.

Comet Creed

This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same:

"As a Comet, I pledge honesty, integrity, and service in all that I do."

Accommodations for Students with Disabilities

The University of Texas at Dallas is committed to providing reasonable accommodations for all persons with disabilities. The syllabus is available in alternate formats upon request. If you are seeking classroom accommodations under the Americans with Disabilities Act (2008), you are required to register with the AccessAbility Resource Center, located in the Administration Building (AD), Suite 2.224. Their phone number is 972-883-2098, email: accessability@utdallas.edu(opens in a new tab) and website is https://accessability.utdallas.edu(opens in a new tab) . To receive academic accommodations for this class, please obtain the proper AccessAbility Resource Center letter of accommodation and meet with me at the beginning of the semester.

Academic Support Resources

The information contained in the following link lists the University's academic support resources for all students. Please go to the Academic Support Resources webpage for these policies.

UT Dallas Syllabus Policies and Procedures

The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus. Please go to UT Dallas Syllabus Policies webpage for these policies.

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.